

true in this species, then we expect any mixed distribution to approach the normal in form. The only sample whose distribution is significantly platykurtic is that of returning birds at banding. This sample is certain to contain adults and young of both sexes. The samples called "immature" and "returning birds at return" may each be considered uniform as to its age composition but composed of both sexes. There is no feasible way at present of analyzing these samples to find a distribution for each sex. I will hazard a guess that the difference between the average wing lengths of males and females does not exceed 2 mm.

At Hillsboro, N. C., I have not handled more than three out of over 1400 juncos that could be alleged to be *J. b. carolinensis*. The samples are taxonomically uniform.

I conclude that the mean difference in wing length between immature and adult *J. b. hyemalis* is about $3\frac{1}{2}$ mm. and the sexual difference about 2 mm., and that lack of brown and the presence of white covert tips are both marks of old adults.

REFERENCE

- Croxton, F. E. 1959. Elementary Statistics with Applications in Medicine and the Biological Sciences. Dover, pp. vii & 376.
— Charles H. Blake, Museum of Comparative Zoology, Cambridge, Mass.

Reverse Migration by Cowbirds.—On April 12, 1961, I caught and released an adult male Brown-headed Cowbird (*Molothrus ater*) at Brooks School, North Andover, Massachusetts, coordinates 4242-7106. The bird was banded 59-171302 on April 4, 1961, by F. Burton Whitman, Jr., at Merepoint, Maine, on Casco Bay, six miles due south of Brunswick, Maine. North Andover is approximately 95 miles southwest of Merepoint. In a letter dated October 4, 1961, Mr. Whitman told me of a female Cowbird caught at Merepoint on May 3, 1961, that had been banded by Minot Morse, Jr., on April 22, 1961, at Castine, Hancock County, Belfast Bay, Maine, about 70 miles northeast of Merepoint.

These two instances of reverse migration may corroborate radar observations. William H. Drury (*Natural History*, 70: 11-17, 1961) reports that on May 8/9, 14/15, and 22/23, 1959, radar showed a steady southward movement following the spring arrival of cold fronts. Aaron M. Bagg informed me, in a letter dated October 11, 1961, that there was a considerable amount of cool, northerly weather in both periods that I mentioned, between bandings and recoveries. He also stated that on both April 12 and May 3, 1961, a coastal type of storm was passing through New England, northeastward, or just had passed, and that the two Cowbirds may have backtracked in the counter-clockwise airflow around these lows. — Oscar M. Root, Brooks School, North Andover, Massachusetts.

Brown Thrasher Life History Data.—Information of more than usual value was obtained from a set of records compiled at the Massachusetts Audubon Society's Arcadia Wildlife Sanctuary in Northampton and Easthampton, Massachusetts. The coordinates of the Station are 4217-7238. The series comprise the 34 return records from a total of 126 Brown Thrashers (*Toxostoma rufum*) banded in the period 1945-1960. No recoveries from distant points were recorded.

The series of return records on one particular individual Brown Thrasher are especially interesting. This Thrasher was first banded as an adult male on May 1, 1953, with a single red celluloid band. The color band was applied alone because the Station temporarily did not have size 3 numbered aluminum bands in stock. On the basis of the red band, repeat records were made on May 2, 4, 8, 1953. When the bird repeated on July 6, 1953, regular numbered aluminum band 543-99501 was applied. It then repeated on July 7, 9, 15, 16, 17, 22, 1953.

Return records, and the information obtained on this bird, are as follows:—

R.1	May 6, 1954	Repeated May 11, 12, 18, 19.
R.2	May 2, 1955	Repeated May 4, 11, 12, 17, 19, 24, 25, 31, June 2, 3.
R.3	May 4, 1956	Repeated May 21, July 4.
R.4	May 7, 1957	Repeated May 7, 8, 10, 12, 15, 26, June 14, July 3, July 5*, July 9, 11, 12, 15, 16, 17, 18, August 5*, August 6, 7, 12, 14, 15, 19, 20, September 9*, September 20.

R.5	May 13, 1958	Repeated May 5 — "Plastic band O.K." Repeated June 6, 14, July 10, 11, 28.
R.6	April 29, 1959	April 29, — "Plastic band O.K." Repeated May 6, May 7, 18, — Plastic red band lost, new one put on. Repeated May 20, 21, June 4, September 18, 19.
R.7	April 23, 1960	Repeated April 30, May 5, 6, 10, 11, 13, 16, 19.

* On July 5, 1957, the records state that the bottom mandible was 4 mm. longer than the upper mandible. On August 5, 1957, no record of abnormality was noted. On September 9, 1957, again no mention was made of a bill abnormality, but it was stated that "molt was three-fourths complete." The fact that a notation on molt was made, would indicate that reasonable care was made in examining the bird. Under these circumstances, it would seem fair to assume that no bill abnormality was present on September 9, 1957, and most likely so on August 5, 1957, even though the time elapsed seems surprisingly short.

It would seem several items of more than usual interest should be mentioned. First, the matter of the lower mandible returning to normal. According to our records, it appears entirely possible that this abnormality corrected itself in one month. After being 4 mm. longer than the upper one, the lower mandible returned to normal. Second, is the fact that the first red plastic band applied lasted for five years. This is of interest, inasmuch as some bird-banding operators believed plastic bands had an extremely short life-span. Also, it has been indicated that plastic bands were injurious to birds. This record would seem to refute that. Third, is the age reached by this Brown Thrasher — at least eight years old. The further fact that a male Brown Thrasher returned to its nesting territory with such tenacity is of interest, but merely confirms this already well-authenticated habit of many bird species. Also noteworthy is the fact that with increasing age, this male Brown Thrasher arrived at a slightly earlier date on its nesting territory. The series as a whole gives outside dates of April 23 - May 13 for arrival.

The records of new bandings for this species give a season at Arcadia of April 22 to September 30. From field observations recorded by Samuel A. Eliot, Jr., in the Northampton, Massachusetts Area, we are able to list the following: "Normal arrival date around April 17, with some records earlier. Normal departure could be said to occur during the second week of October." Professor Eliot has records which indicate occasional wintering by this species in the area mentioned. There is, of course, the likelihood that such records are made by individuals which for one reason or another lost the urge to migrate at the proper time, and so wintered.

Because Brown Thrasher 543-99501 was wearing its red plastic band, as well as its numbered aluminum one, it was used as a visual educational aid more than it might otherwise have been. This bird was shown to, and discussed by, many hundreds of school-class visitors to the Sanctuary. Actually, in a few instances, the children were looking at, and sometimes even holding, a bird which was as old as they were. This had terrific impact, even though the extreme ages sometimes reached by birds was usually mentioned in the context of the short life-span which is the normal thing in birds.

To indicate how unusual is the eight-year life span reached by Brown Thrasher 543-99501, from a table of the return records for this species as compiled from the Arcadia Wildlife Sanctuary records for the years 1945-1960, we find that out of the 126 banded, only 34 returned, or 27 percent. There are 13 birds which returned once, 10 twice, 7 on three occasions, 2 four times, one five, 1 six, and 1 seven. Only one bird, the one previously referred to at length, returned for the fifth, sixth, and seventh time.

From another table of the return records for the years 1947 (when the first return records were made) to 1959, omitting those birds which could not be satisfactorily determined, we find a sex ratio in the returns taken of 13 males to 9 females. The technique used was the cloacal one described by Mason, *Bird-Banding*, 9: 46-48, 1938. This table indicates by definite determinations at the time of banding that 19 adults and 86 immatures were in the group.

Eleven birds which were banded as adults returned out of 105 banded, or 10 percent. It is noteworthy that out of this same total of 105 banded, only 2 birds banded as immatures returned, or 2 percent. These figures again show that birds banded as adults are more apt to be taken as returns in nesting territories, than are birds banded as immatures.

SUMMARY

During the period 1945-1960, 126 Brown Thrashers were banded at Arcadia Wildlife Sanctuary in Northampton and Easthampton, Massachusetts. An examination of the return records showed that only 34 birds of the 126 banded returned, or 27 percent. One bird returned seven times, reaching an age of eight. A red plastic band on this bird lasted five years. From a group of returns with definite determinations, a sex ratio of 13 males and 9 females was found. Eleven of the returning birds, or 10 percent, were adults when banded. Two birds, or 2 percent, were immatures when banded. — Edwin A. Mason, Arcadia Wildlife Sanctuary, Northampton, Massachusetts.

RECENT LITERATURE

MIGRATION

1. **Problems of Mediterranean-Saharan migration.** R. E. Moreau. 1961. *Ibis*, 103a(3): 373-427; 103a(4): 580-623. Two vast and largely land-locked seas, the Gulf of Mexico and the Mediterranean, pose problems for birds migrating back and forth between holarctic and tropical regions. Many European ornithologists have felt that such birds tend to detour around the widest parts of the Mediterranean. The most commanding voice of dissent for more than two decades has been that of R. E. Moreau. Now in a 99-page synthesis, he reviews the reasons for his deepening conviction that the smaller migrants usually cross the Mediterranean on a broad front.

The Gulf of Mexico exceeds the Mediterranean in north-south expanse but is far inferior in east-west dimension. At first glance the average trans-Gulf migrant would seem to risk more to gain less than the average trans-Mediterranean migrant. Moreau demolishes this notion. Most crossings of the Mediterranean are closely linked with at least a 900-mile traverse of the Sahara, where to land without shade is to court death and where the oases are like "a few dozen teacups" scattered in a football field. Worse still, spring migrants must expect head winds everywhere over the desert unless they fly northeastward, at high altitude. Moreau believes that most adopt the diagonal course, which though much longer in mileage should average much shorter in time. He rates the journey from central African latitudes to Europe "potentially the most arduous to be performed regularly by a mass of land-birds anywhere in the world." In spite of the greater distances involved in migration across the Banda Sea, he may be right. Certainly his conclusion that trans-Saharan migrants must be able to continue for 2 to 2½ days without refueling well exceeds the most pessimistic estimates for trans-Gulf passage.

A belt of vegetation varying in width from more than 200 miles to only a few miles intervenes between the Mediterranean and the northern edge of the desert. Here spring migrants from south of the Sahara can pause before launching out again on another nonstop flight, this time over the sea. Observations of grounded migrants all along this belt of vegetation in spring are the core of the evidence that most small bird traffic between Europe and Africa is on a broad front. Moreau assembles the data from 8 sectors of the southern Mediterranean coast for 57 species of non-soaring land birds, nearly all the birds of this sort that breed wholly or partly within the same longitudes as North Africa and winter wholly or almost wholly south of the Sahara. He presents these data both in a series of species accounts and in a semigraphic table somewhat reminiscent of the table of relative abundance once provided for the Gulf of Mexico (see *Bird-Banding*, 29 (1): Review 5).

Though migrants are obviously much more numerous in fall than in spring, the volume of migration usually appears much greater at the latter season to field observers along the northern shores of the Gulf of Mexico. Such too has been the case in Moreau's central sectors — Algeria, Tunisia, Tripoli, and Cyrenaica. But both to the east and to the west of these sectors, the seasonal disparity is not so great. The general situation suggests that most migrants with adaptations for the difficult spring flight across the Sahara have ample reserves for a nonstop passage from Europe to their wintering grounds in autumn, when the air flows are more favorable. This assumption provides an alternative explanation of much of the evidence for such phenomena as "loop migration" and the European migratory divide.

Moreau is keenly aware how delusive counts of grounded migrants are. Repeatedly the reader senses loopholes in reasoning and just as repeatedly finds them anticipated. The process has a disarming quality, but it does not remove the difficulty